



4910-06-P

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

Safety Advisory 2012-03

Buckling-Prone Conditions in Continuous Welded Rail Track

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of Safety Advisory.

SUMMARY: FRA is issuing Safety Advisory 2012-03 to remind track owners, railroads, and their employees of the importance of complying with their continuous welded rail (CWR) plan procedures and reviewing their current internal engineering instructions that address inspecting CWR track to identify buckling-prone conditions. In an effort to heighten awareness of the potential consequences of an unexpected track buckle, particularly considering the unusually high, and prolonged, record-breaking temperatures that have affected much of the United States in recent weeks, this notice highlights a series of recent train accidents involving derailments that were preliminarily determined by the respective railroads to be caused by the rail buckling under extreme heat conditions (commonly referred to as “sun kinks” in the rail). This notice contains recommendations to track owners and railroads to ensure their employees comply with the requirements of their CWR plan procedures that address inspecting track to identify buckling-prone conditions in CWR track, particularly if the track is located on or near railroad bridges. It also recommends that track owners and railroads review current

internal engineering instructions to ensure that the instructions properly identify the necessary track maintenance instructions to prevent track buckling during extreme heat conditions.

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SUPPLEMENTARY INFORMATION:

Background

The overall safety of railroad operations has improved in recent years. However, a series of recent accidents has highlighted the need for track owners, railroads, and their respective employees to review, reemphasize, and adhere to the requirements of a track owner's CWR plan procedures and current internal engineering instructions that address inspecting track to identify buckling-prone conditions in CWR track, particularly if the track is located on or near railroad bridges.

FRA requires that a track owner comply with the contents of a CWR plan that is approved or conditionally approved under Title 49 Code of Federal Regulations (CFR) Section 213.118.¹ See § 213.119. The plan must include procedures that prescribe when physical track inspections are to be performed. See § 213.119(g). At a minimum, these

¹ All references in this notice to a section or other provision of a regulation are to a section, part, or other provision in 49 CFR, unless otherwise specified.

procedures are required to address inspecting track to identify buckling-prone conditions in CWR track, locations where tight or kinky rail conditions are likely to occur, locations where track work (disturbing the roadbed or ballast section and reducing the lateral or longitudinal resistance of the track) has recently been performed, and pull-apart prone conditions in CWR track, including locations where pull-apart or stripped-joint rail conditions are likely to occur. See § 213.119(g)(1). In formulating such procedures, the track owner is required to specify when the inspections will be conducted, as well as the appropriate remedial actions to be taken when either buckling-prone or pull-apart prone conditions are found. See § 213.119(g)(2).

CWR can produce peculiar maintenance issues for the railroad industry due to the constant temperature changes that rails experience because they are exposed to the open air and radiant heat from the sun. These temperature changes in CWR can create longitudinal stresses in the rail due to the constraints along the rail in conjunction with the thermal expansion or contraction of the rail steel. During long-term exposure to extremely high temperatures, the longitudinal stress in the rail can result in an unexpected track buckle (or kink). In addition, if the track buckle occurs on track that is located on or near a railroad bridge, the consequences of any subsequent derailment at that location can be compounded, often resulting in more severe damage and sometimes death.

During the course of the last few weeks, the railroad industry has experienced four derailments that resulted in two fatalities and more than \$5,000,000 in FRA-reportable railroad property damage. Based on preliminary investigations by the involved railroads, it appears that these four incidents may have occurred because of

extremely high compressive forces that were present in the rail, which resulted from the record-setting excessive heat wave that has recently affected most of the United States.

Recent Incidents

The following is a brief summary of the circumstances surrounding each of the recent train derailments that appear to have been heat-related incidents. Information regarding these incidents is based on FRA's and the respective railroad's preliminary investigations and findings to date. The probable causes and contributing factors, if any, have not yet been established. Therefore, nothing in this safety advisory is intended to attribute a cause to these incidents, or place responsibility for these incidents on the acts or omissions of any person or entity.

1. On July 4, 2012, at approximately 5:30 p.m., a BNSF Railway Company (BNSF) train crew noticed a sun kink (buckled track) in the rail ahead, and attempted to stop, but were unable to do so, which caused 43 loaded coal cars to derail in Pendleton, TX. BNSF preliminarily determined the cause of the derailment to be buckled track.
2. On July 4, 2012, at approximately 1:30 p.m., a northbound Union Pacific Railroad Company (UP) coal train with 137 cars, traveling at 39 mph, derailed 31 loaded coal cars in Northbrook, IL. The derailment occurred in a populated area on a steel trestle spanning a four-lane street. The bridge was destroyed, and the derailed cars fell on the roadway below, resulting in two fatalities. UP preliminarily determined the cause of the derailment to be buckled track adjacent to the bridge span.

3. On July 2, 2012, at approximately 6:30 p.m., a westbound BNSF unit coal train derailed 31 loaded cars of coal next to a public grade crossing in Mesa, WA. The train crew had reported feeling rough track going through the grade crossing, and then placed the train into emergency braking. BNSF preliminarily determined the cause of the derailment to be buckled track.
4. On June 23, 2012, at approximately 6:40 p.m., an eastbound UP coal train derailed 22 cars in the Powder River coal fields in Bill, WY. UP preliminarily determined the cause of the derailment to be buckled track.

RECOMMENDED ACTION: In light of the above discussion, FRA recommends that track owners and railroads:

1. Review with their employees the circumstances of the four track-buckling-related derailments identified above.
2. Discuss the requirements of CWR plans with employees responsible for inspecting CWR, with a focus on inspecting CWR track to identify buckling-prone conditions, and conditions that can lead to buckled track, such as recently-disturbed track, locations where rail was repaired or replaced, and locations that experience excessive load dynamics.
3. Evaluate and ensure that employees responsible for the inspection and repair of CWR track have been adequately trained and are capable of performing proper inspection and repair procedures.
4. Reinforce with employees responsible for inspecting track the importance of maintaining sufficient anchoring and ballast to maintain track lateral resistance, especially around fixed track structures (such as grade crossings, turnouts, and

bridges), where the rail conditions are considerably tighter and are therefore more susceptible to the development of track buckles.

5. Review recent track maintenance records to identify previous buckling incidents, and their locations, for future inspection focus.
6. Apply heat-restriction slow orders at necessary locations, with consideration of populated areas, in order to significantly decrease the likelihood of a derailment and reduce the severity and consequences of any derailments that may occur.
7. Apply appropriate slow orders at speeds that will permit the passage of sufficient time and tonnage to restore track stabilization at disturbed track locations.
8. Review current internal engineering instructions to ensure that the instructions properly identify the necessary track maintenance instructions to prevent track buckling during extreme heat conditions.

FRA encourages railroad industry members to take actions that are consistent with the preceding recommendations and to take other actions to help ensure the safety of the Nation's railroad employees and the public. FRA may modify this Safety Advisory 2012-03, issue additional safety advisories, or take other appropriate actions it deems necessary to ensure the highest level of safety on the Nation's railroads, including pursuing other corrective measures under its rail safety authority.

Issued in Washington, DC, on July 11, 2012

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for Regulatory and Legislative Operations

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